

# SHAOXING SIYUAN KEJI CO.,LTD

## The wireless remote controller

Main Model: TX0201

Serial Model: N/A

June 25, 2014

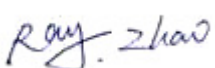
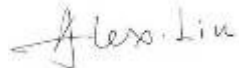

Report No.: 14020563-FCC-R1

(This report supersedes NONE)



Modifications made to the product : None

This Test Report is Issued Under the Authority of:

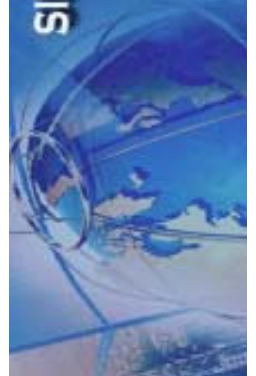
		
Ray Zhao Compliance Engineer	Alex Liu Technical Manager	

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Test result presented in this test report is applicable to the representative sample only.

# RF Test Report

To: FCC 15.231:2013, ANSI C63.4:2009

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## Laboratory Introduction

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Country/Region	Scope
USA	EMC , RF/Wireless , Telecom
Canada	EMC, RF/Wireless , Telecom
Taiwan	EMC, RF, Telecom , Safety
Hong Kong	RF/Wireless ,Telecom
Australia	EMC, RF, Telecom , Safety
Korea	EMI, EMS, RF , Telecom, Safety
Japan	EMI, RF/Wireless, Telecom
Singapore	EMC , RF , Telecom
Europe	EMC, RF, Telecom , Safety



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# 1 EXECUTIVE SUMMARY & EUT INFORMATION

**The purpose of this test programmed was to demonstrate compliance of the SHAOXING SIYUAN KEJI CO.,LTD. The The wireless remote controller and model: TX0201 against the current Stipulated Standards. The The wireless remote controller has demonstrated compliance with the FCC 15.231:2013, ANSI C63.4:2009.**

## EUT Information

<b>EUT Description</b>	<b>The wireless remote controller</b>
<b>Main Model</b>	<b>TX0201</b>
<b>Serial Model</b>	<b>N/A</b>
<b>Antenna Gain</b>	<b>2 dBi</b>
<b>Input Power</b>	<b>3*2V DC battery of power supply</b>
<b>Classification Per Stipulated Test Standard</b>	<b>FCC 15.231:2013, ANSI C63.4:2009</b>

## 2 TECHNICAL DETAILS

<b>Purpose</b>	<b>Compliance testing of The wireless remote controller with stipulated standard</b>
<b>Applicant / Client</b>	<b>SHAOXING SIYUAN KEJI CO.,LTD The Cross Of Yueying Road And Qisheng Road,Paojiang Industrial Commercial Park,ShaoXing City</b>
<b>Manufacturer</b>	<b>SHAOXING SIYUAN KEJI CO.,LTD The Cross Of Yueying Road And Qisheng Road,Paojiang Industrial Commercial Park,ShaoXing City</b>
<b>Laboratory performing the tests</b>	<b>SIEMIC (Nanjing-China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email: China@siemic.com.cn</b>
<b>Test report reference number</b>	<b>14020563-FCC-R1</b>
<b>Date EUT received</b>	<b>June 17, 2014</b>
<b>Standard applied</b>	<b>FCC 15.231:2013, ANSI C63.4:2009</b>
<b>Dates of test</b>	<b>June 23 to June 27, 2014</b>
<b>No of Units:</b>	<b>1#</b>
<b>Equipment Category:</b>	<b>DSC</b>
<b>Trade Name :</b>	<b>N/A</b>
<b>RF Operating Frequency (ies)</b>	<b>Tx: 433.776MHz</b>
<b>Number of Channels :</b>	<b>1 CH</b>
<b>Modulation :</b>	<b>ASK</b>
<b>FCC ID:</b>	<b>RKWTX0201</b>



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### **3 MODIFICATION**

**NONE**

## 4 TEST SUMMARY

The product was tested in accordance with the following specifications.  
All testing has been performed according to below product classification:

### Test Results Summary

Test Standard	Description	Pass / Fail
CFR 47 Part 15.231: 2013		
15.203	Antenna Requirement	Pass
15.207	Conducted Emissions Voltage	N/A
15.231(b)	Fundamental & Radiated Spurious Emission	Pass
15.231(c)	20dB Bandwidth	Pass
15.231(a)(1)	Deactivation	Pass
ANSI C63.4: 2009		
PS: All measurement uncertainties are not taken into consideration for all presented test result.		

# **5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS**

## **5.1 Antenna Requirement**

**Requirement(s):** 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna is permanently attached to the device which meets the requirement.

## **5.2 Conducted Emissions Voltage**

Requirement:

<b>Frequency of emission (MHz)</b>	<b>Conducted limit (dBμV)</b>	
	<b>Quasi-peak</b>	<b>Average</b>
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

\*Decreases with the logarithm of the frequency.

### **Procedures:**

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.
4. Environmental Conditions

Temperature	20°C
Relative Humidity	48%
Atmospheric Pressure	1019mbar
5. Test date : N/A  
Tested By : Ray Zhao

**Test result: N/A (Batteries operated)**

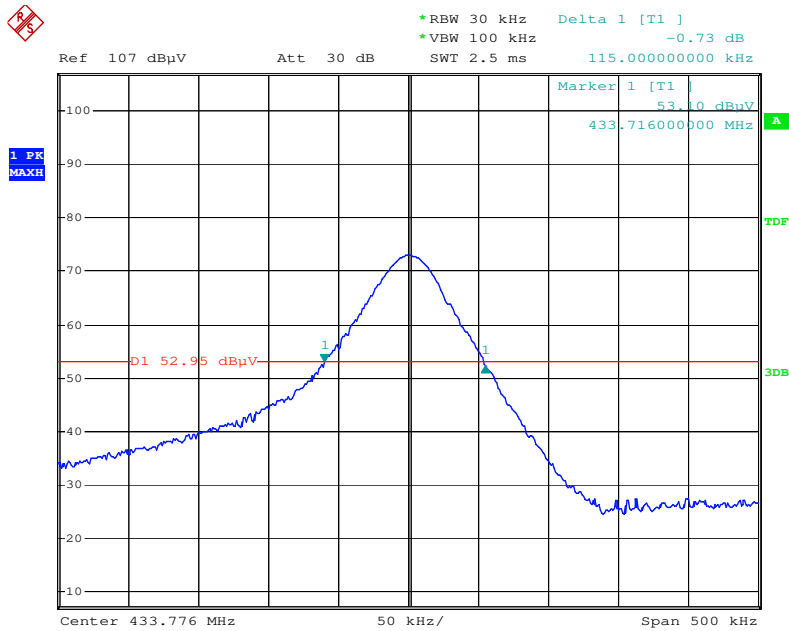
### 5.3 20dB Occupied Bandwidth

1. 20dB bandwidth was measured by conducted method using a spectrum analyzer.
2. Environmental Conditions
 

Temperature	20°C
Relative Humidity	51%
Atmospheric Pressure	1009mbar
3. Test Date: June 23, 2014  
Test By: Ray Zhao

**Test Result:**

Fundamental Frequency (MHz)	Measured 20dB Bandwidth (kHz)	FCC 15.231 Limit (kHz)	Result
433.776	115	1084.44	Pass



Date: 23.JUN.2014 21:39:30

## **5.4 Radiated Fundamental and Spurious Emission**

1. Radiated emissions were measured according to ANSI C63.4. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1meter above the ground from the center of the loop. The measuring bandwidth was set to 10kHz. All possible modes of operation were investigated. Only the worst case emissions measured, All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Sample Calculation: Corrected Amplitude=Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor.  
Sample Calculation:  
1) Corrected Amplitude= Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor  
2) Average = peak reading + 20log(duty cycle)
4. Radiated Emissions Measurement Uncertainty  
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz( QP only3m & 10m) is +5.6/-4.5dB(for EUTs<0.5m×0.5m×0.5m).In range of 1-40GHz) is ±3.6dB.
5. Environmental Conditions

Temperature	20°C
Relative Humidity	50%
Atmospheric Pressure	1009mbar
6. Test date : June 23, 2014  
Tested By : Ray Zhao

### **Standard Requirement:**

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750	125 to 375
174-260	3750	375
260-470	3750-12500	375 to 1250
Above 470	12500	1250

**Test Result:** Pass

**Fundamental Measurement @ 433.776MHz @3 Meter FCC 15.231(a)**

Frequency (MHz)	correct (dBμV/m)	Azimuth	Polarity	Height(m)	Factors(dB)	FCC 15.231(a) Limit (dBμV)	Margin(dB)	Comments
433.776	73.20	88	V	1	-28.34	100.82	-27.62	Peak
433.776	66.67	-	V	-	-	80.82	-14.15	Ave
433.776	72.32	278	H	1	-28.34	100.82	-28.50	Peak
433.776	65.79	-	H	-	-	80.82	-15.03	Ave

**Spurious Emissions (<1GHz) Measurement @ 3 Meter FCC 15.231(a)**

Frequency (MHz)	correct (dBμV/m)	Azimuth	Polarity	Height(m)	Factors(dB)	FCC 15.231(a) Limit (dBμV)	Margin(dB)	Comments
867.552	55.78	114.5	V	1	-18.15	80.82	-25.04	Pk
867.552	49.25	-	V	-	-	60.82	-11.57	Ave
867.552	55.16	101	H	1	-18.15	80.82	-25.66	Pk
867.552	48.63	-	H	-	-	60.82	-12.19	Ave

Notes:

1. Duty cycle is 47.13%,  $20\log(\text{duty cycle}) = -6.53\text{dB}$  correction was used to determine the average level from the peak reading. Average = peak reading +  $20\log(\text{duty cycle})$ , Final Average = peak reading -6.53
- 2.
3. All the data measurement of peak values.
4. FCC Limit for Average Measurement =  $41.6667 \times (433.776\text{MHz}) - 7083.3333 = 10990.68\mu\text{V/m} = 80.82\text{dB}\mu\text{V/m}$
5. Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms
6. Maximum average in 100 ms
7. Calculate duty cycle for pulse train or 100 ms
8.  $\text{Duty cycle} = (t_1 + t_2 + t_3 + \dots + t_n) / T$  where  $t_n$  = pulse width, T = pulse train length or 100 ms

### Spurious Emissions (>1GHz) Measurement @ 3 Meter FCC 15.231(a)

Frequency	Height	Polar	Factors (dB)	Amplifier	correct (dB $\mu$ V/m)	FCC 15.231 Limit (dB $\mu$ V/m)	Margin (dB)	Comments
GHz	Meter	H/V	(dB)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	(Pk/Av)
1301.33	100	V	-7	55	47.33	80.82	-33.49	Peak
1301.33	-	V	-7	-	40.80	60.82	-20.02	Ave
1301.33	150	H	-7	55	45.02	80.82	-35.80	Peak
1301.33	-	H	-7	-	38.49	60.82	-22.33	Ave
1735.10	100	V	-6.33	55	42.29	80.82	-38.53	Peak
1735.10	-	V	-6.33	-	35.76	60.82	-25.06	Ave
1735.10	200	H	-6.33	55	44.02	80.82	-36.80	Peak
1735.10	-	H	-6.33	-	37.49	60.82	-23.33	Ave
2168.88	100	V	-5.5	55	41.37	80.82	-39.45	Peak
2168.88	-	V	-5.5	-	34.84	60.82	-25.98	Ave
2168.88	100	H	-5.5	55	43.36	80.82	-37.46	Peak
2168.88	-	H	-5.5	-	36.83	60.82	-23.99	Ave
2602.66	100	V	-4.5	55	40.25	80.82	-40.57	Peak
2602.66	-	V	-4.5	-	33.72	60.82	-27.10	Ave
2602.66	150	H	-4.5	55	41.02	80.82	-39.80	Peak
2602.66	-	H	-4.5	-	34.49	60.82	-26.33	Ave

Note: Duty cycle is 47.13%,  $20\log(\text{duty cycle}) = -6.53\text{dB}$  correction was used to determine the average level from the peak reading. Average = peak reading +  $20\log(\text{duty cycle})$ , final Average = peak reading -  $6.53\text{dB}$

**Note:**

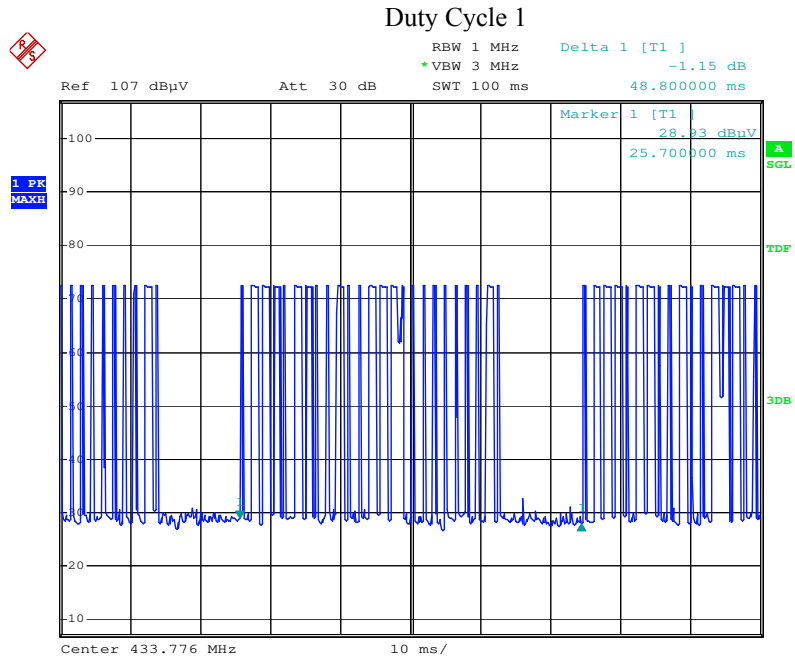
**Pulse width (PW) = 37.4ms**

**$2/PW = 2/37.4\text{ms} = 0.0534759\text{ kHz}$**

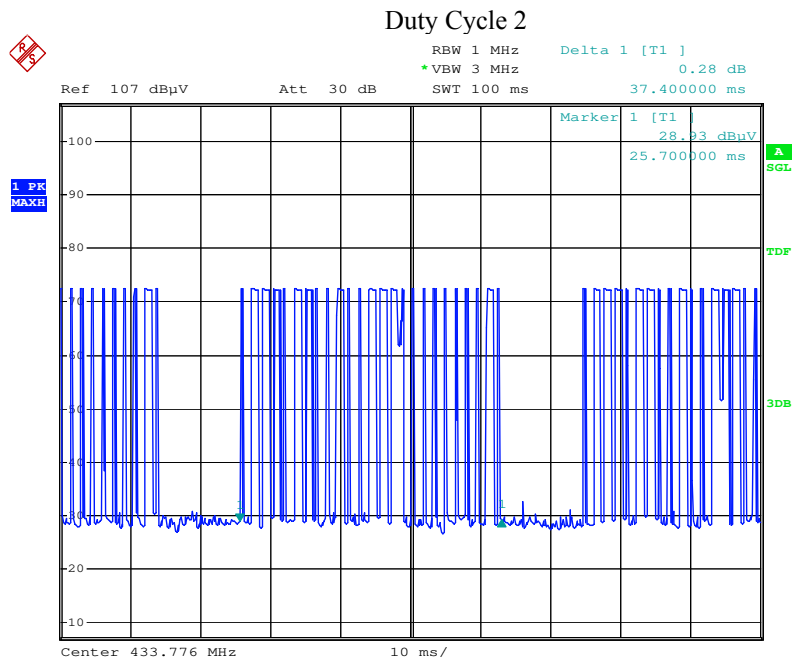
**RBW > 2/PW (0.0534759 kHz)**

**Therefore PDCF is not needed.**

Pulse Duty Cycle:  
Wide Pulse: 1.4ms  
Narrow Pulse: 0.60ms  
Duty cycle=  $(1.4 \times 10 + 0.60 \times 15) / 48.8 = 47.13\%$   
Average Duty Factor:  $20 \times \log(\text{Duty Cycle}) = -6.53\text{dB}$

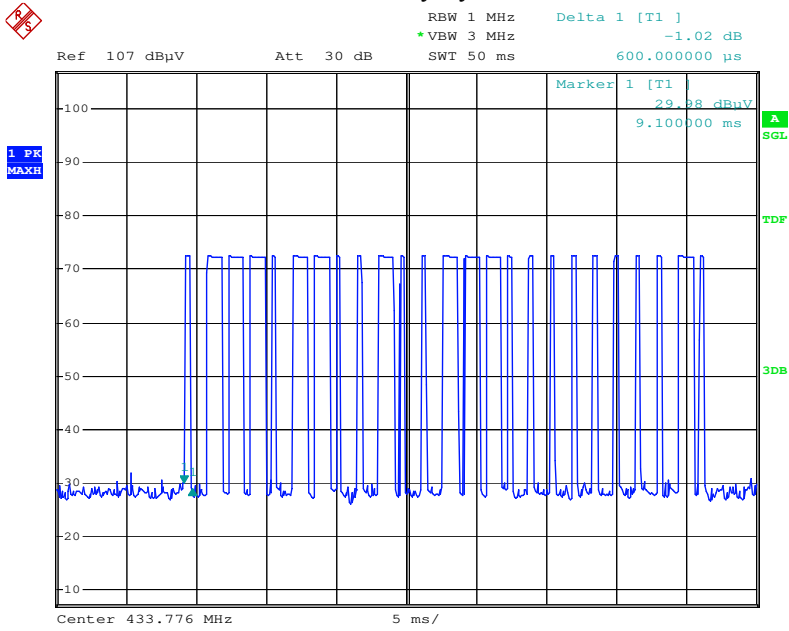


Date: 23.JUN.2014 21:41:55

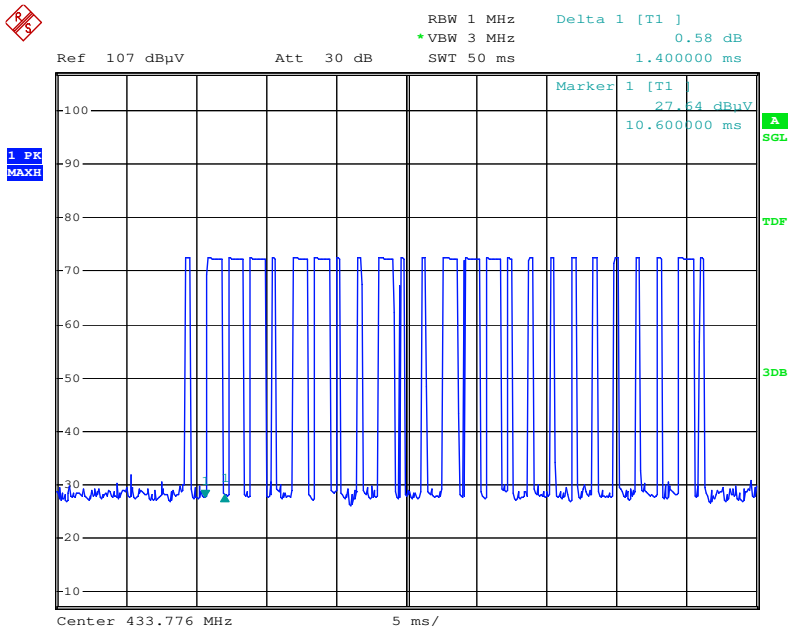


Date: 23.JUN.2014 21:42:10

### Duty Cycle 3



Date: 23.JUN.2014 21:42:54



Date: 23.JUN.2014 21:43:03

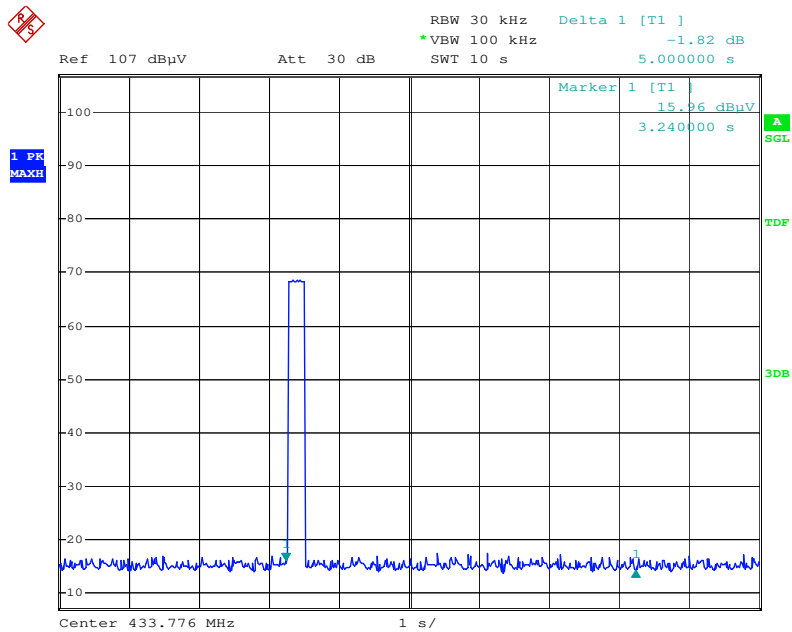
## 5.5 Deactivation

- Deactivation was measured by conducted method using a spectrum analyzer.
- Environmental Conditions
 

Temperature	20°C
Relative Humidity	51%
Atmospheric Pressure	1009mbar
- Test Data: June 27, 2014  
 Test By: Ray Zhao

Standard requirement: 47 CFR §15.231 (a)(1)  
 Release Time < 5 seconds

Test Result: Pass



Date: 27.JUN.2014 18:30:58

**Annex A. TEST INSTRUMENT & METHOD**

**Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES**

Instrument	Model	Serial #	Calibration Date	Calibration Due Date
<b>Radiated Emissions</b>				
R&S Receiver	ESPI 3	101216	09/27/2013	09/26/2014
Hp Spectrum Analyzer	8563E	3821A09023	09/27/2013	09/26/2014
HP Pre-amplifier	8447F	1937A01160	10/27/2013	10/26/2014
Sunol Sciences, Inc. antenna	JB6	A121411	04/15/2014	04/14/2015
A-INFOMW Horn Antenna (1~18GHz)	JXTXLB-10180	J2031081120092	10/09/2013	10/08/2014
MITEQ Pre-Amplifier(0.1 ~ 18GHz)	AMF-7D-00101800-30-10P	1451710	11/03/2013	11/02/2014
SIEMIC Labview Radiated Emissions software	V1.0	N/A	N/A	N/A

**Annex B. EUT AND TEST SETUP PHOTOGRAPHS**

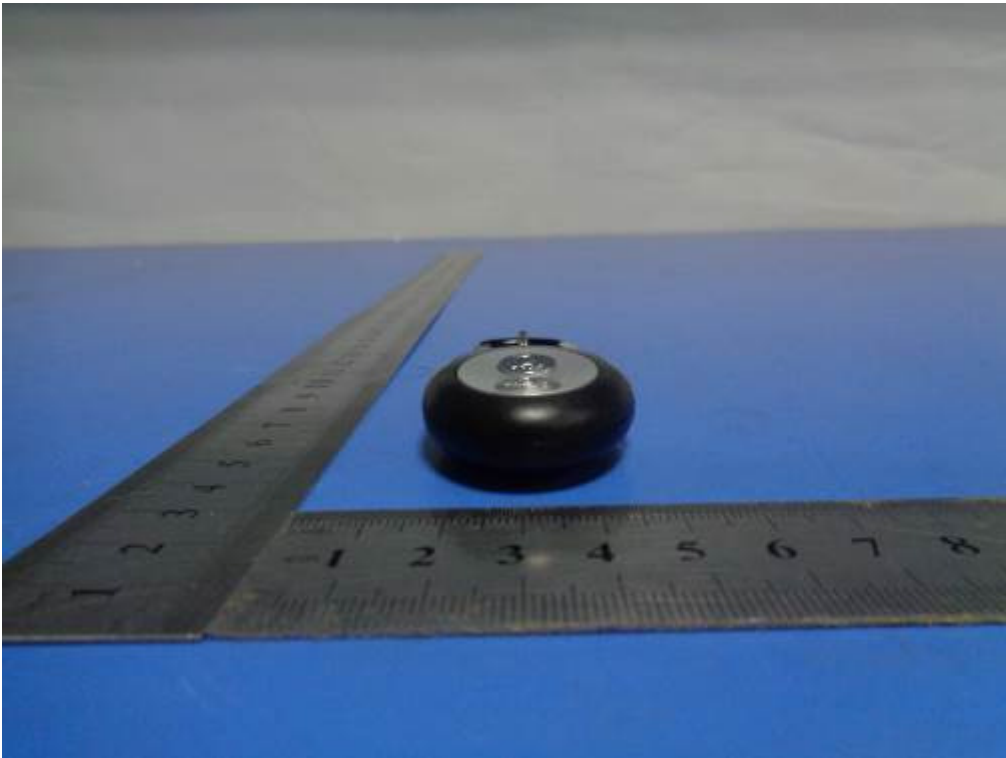
**Annex B.i. Photograph : EUT External Photo**



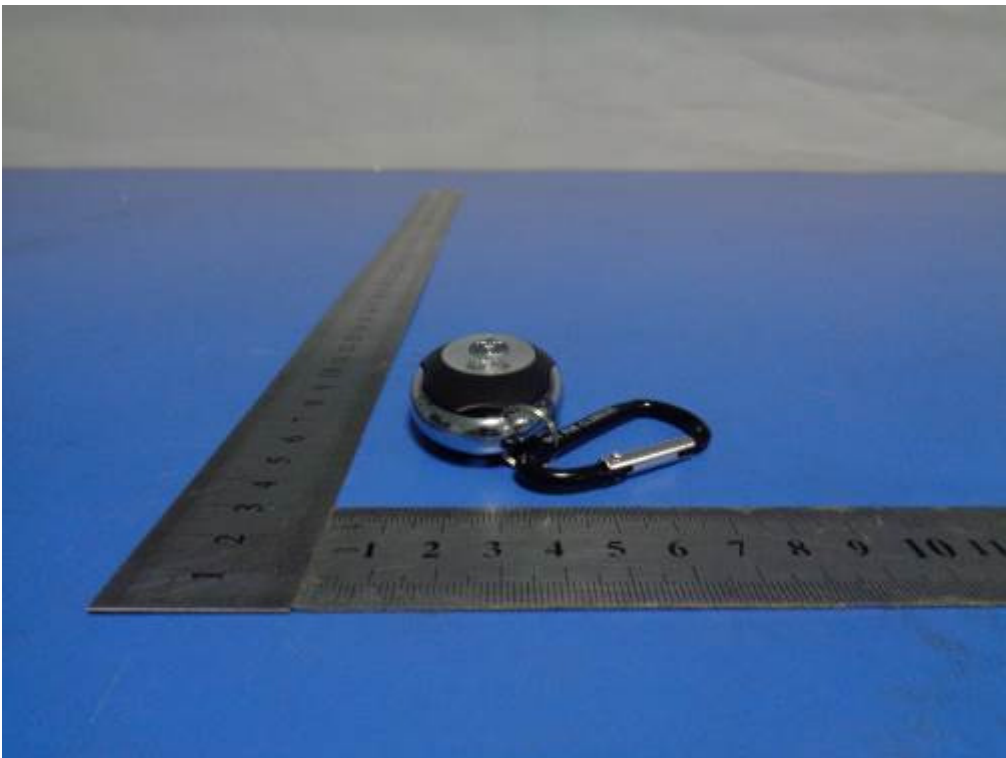
Front View of EUT



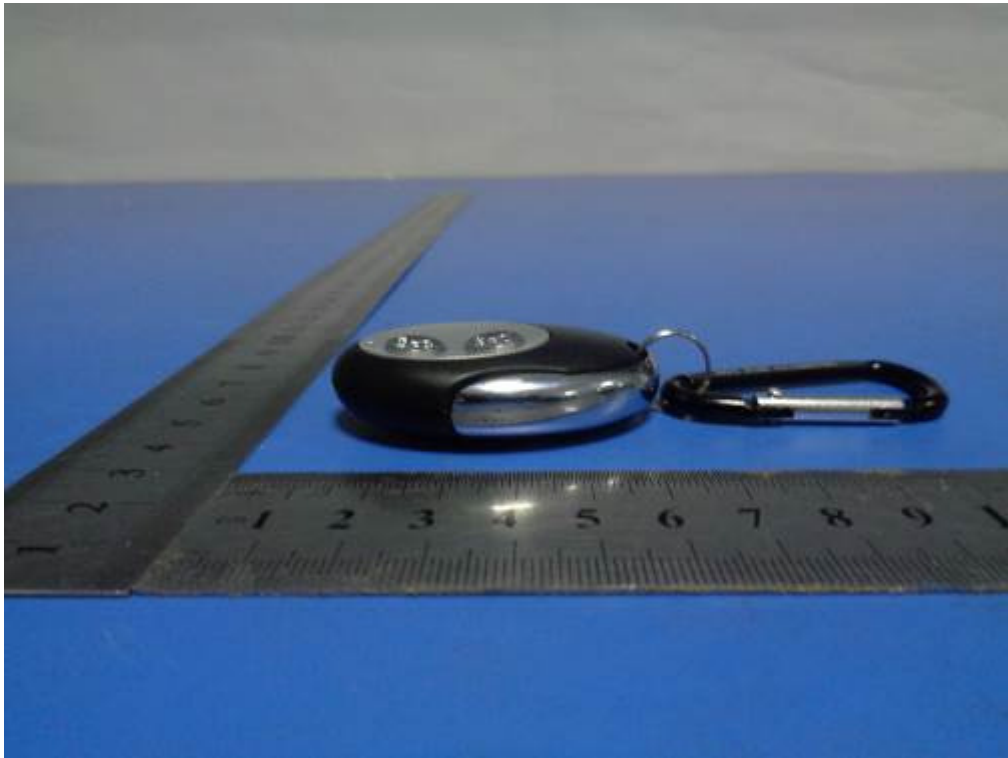
Rear View of EUT



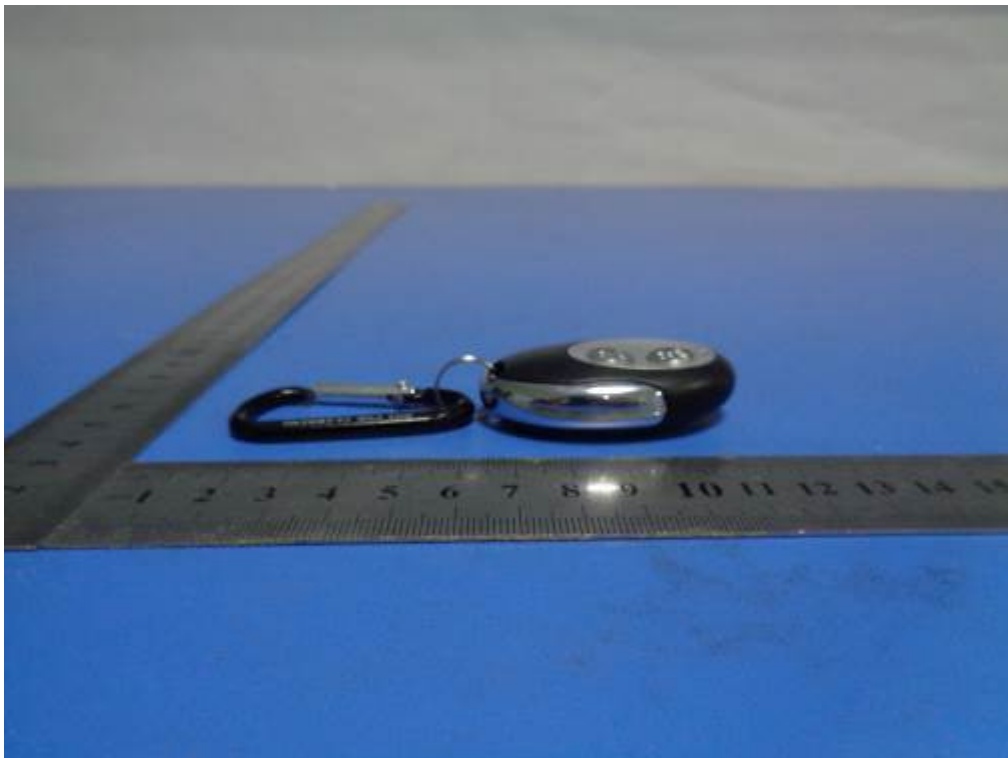
Top View of EUT



Bottom View of EUT



Left View of EUT

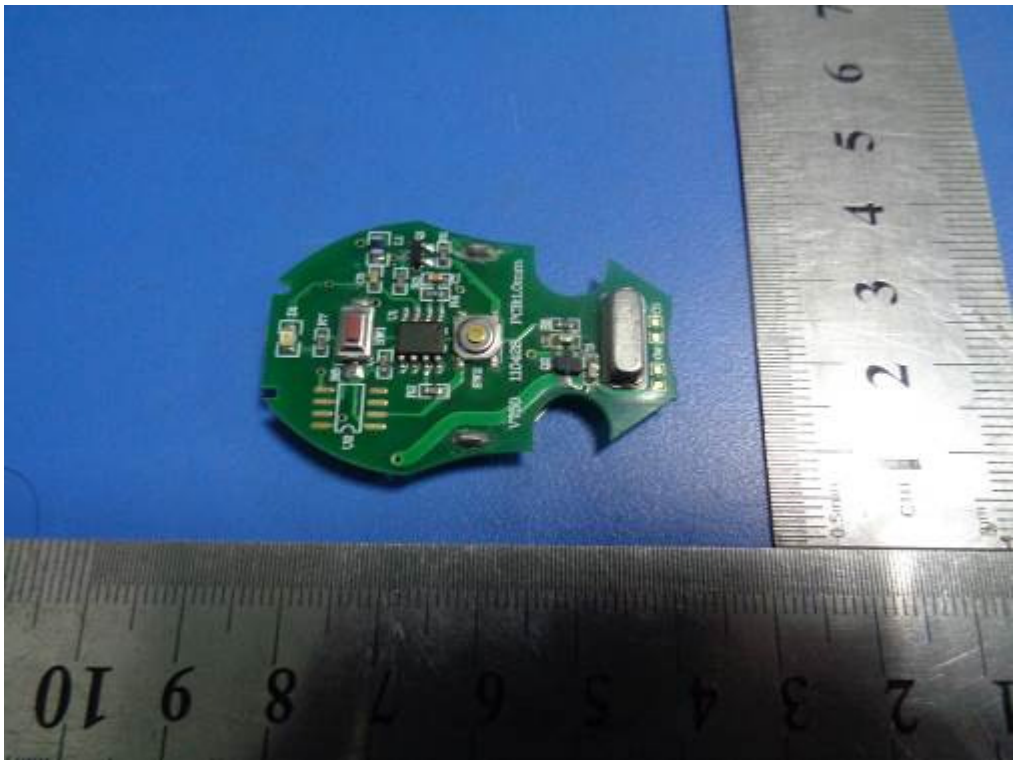


Right View of EUT

**Annex B.ii. Photograph : EUT Internal Photo**

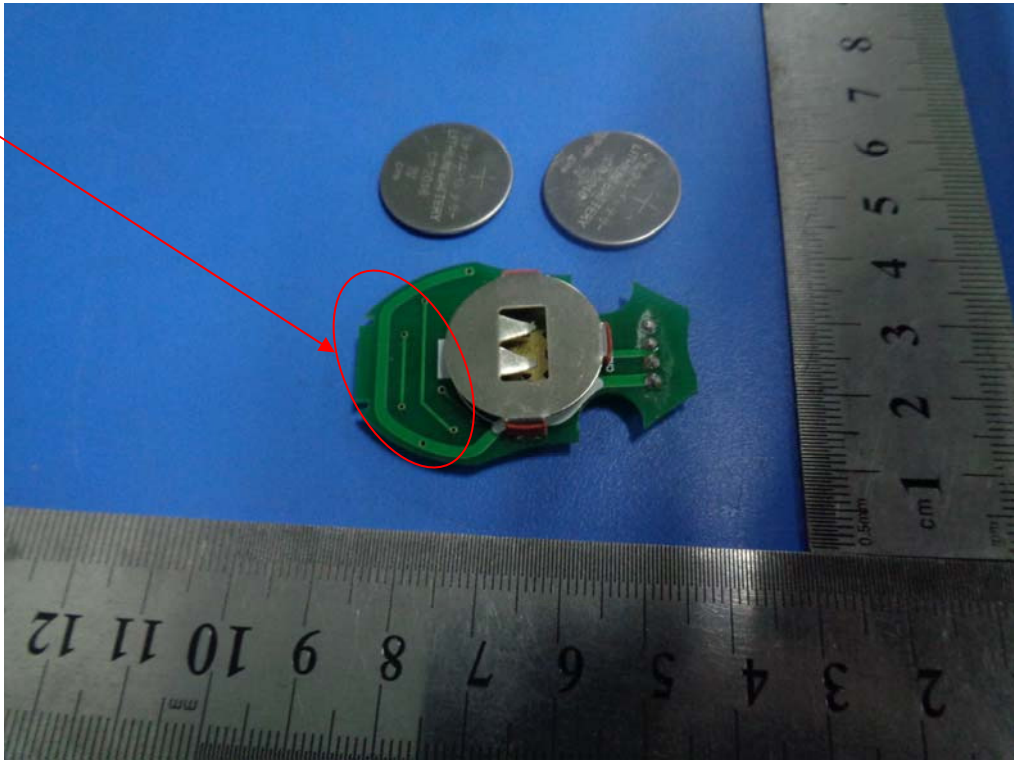


EUT – Uncover Front View



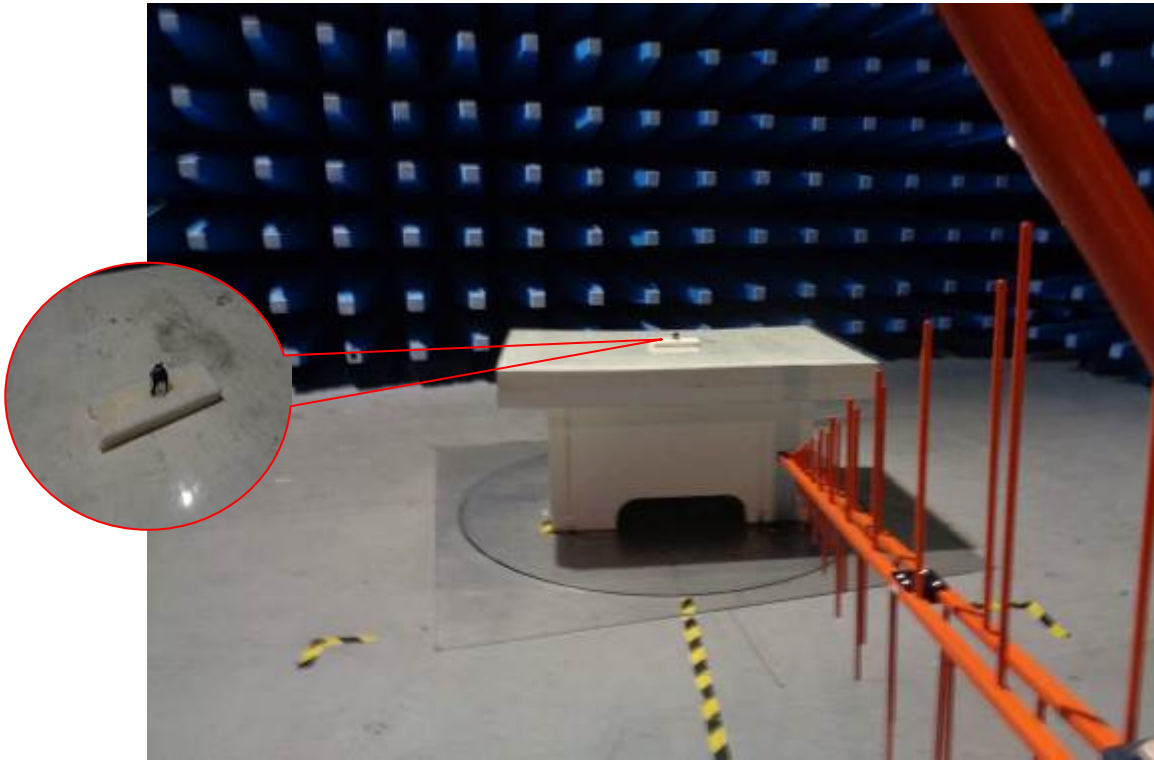
EUT –PCB Front View

Antenna

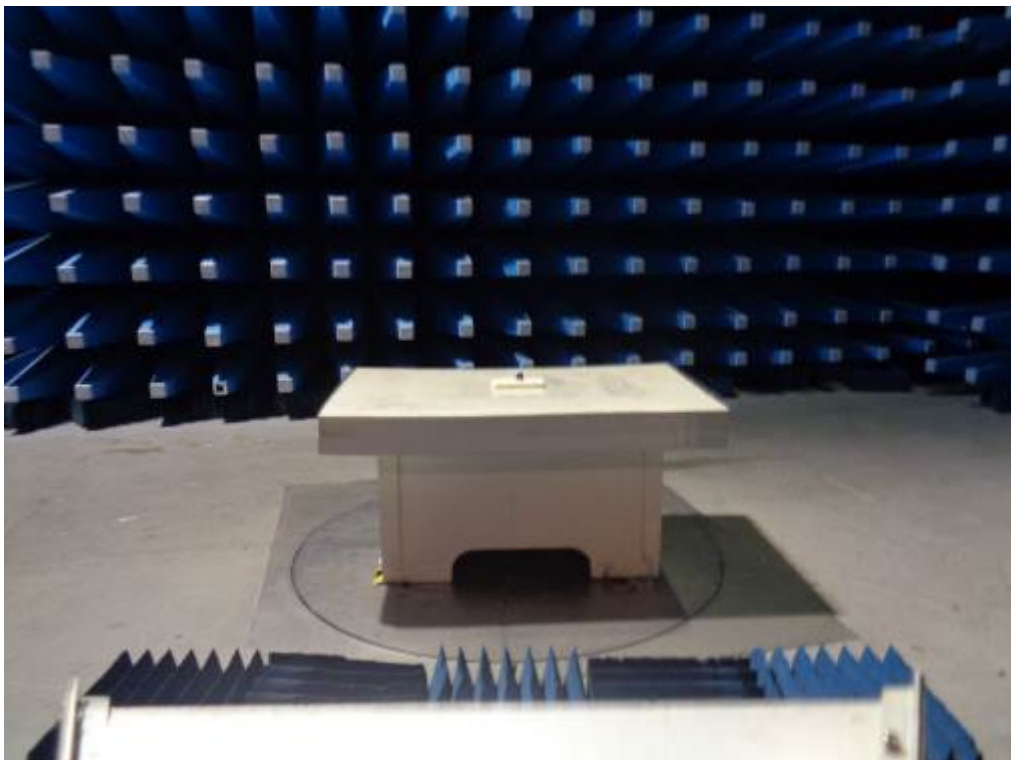


EUT –PCB Rear View

**Annex B.iii. Photograph : Test Setup Photo**



Radiated Emission Test Setup Rear View Below 1GHz



Radiated Emission Test Setup Front View Above 1GHz

**Annex C. TEST SETUP AND SUPPORTING EQUIPMENT**

**EUT TEST CONDITIONS**

**Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION**

The following is a description of supporting equipment and details of cables used with the EUT.

<b>Equipment Description (Including Brand Name)</b>	<b>Model &amp; Serial Number</b>	<b>Cable Description (List Length, Type &amp; Purpose)</b>
N/A	N/A	N/A



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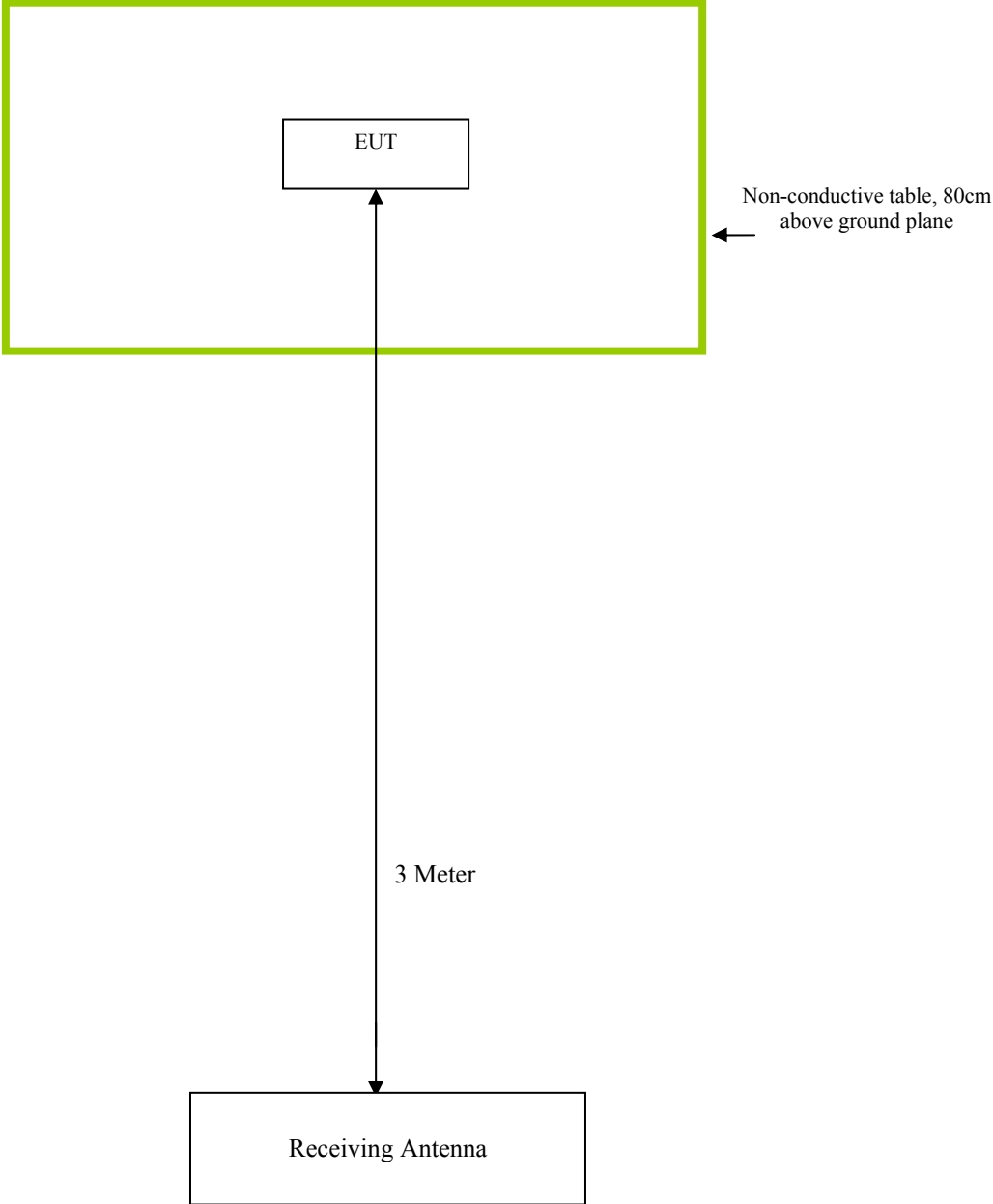
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## **Block Configuration Diagram for Conducted Emission**

**N/A**

**Block Configuration Diagram for Radiated Emission**



**Annex C.ii. EUT OPERATING CONDITIONS**

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
<b>Emissions Testing</b>	TX mode is continuous transmitting with full power.

**Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST**

**Please see attachment**



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## **Annex E. DECLARATION OF SIMILARITY**

N/A